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shape of the rings as seen in the telescope remains practically the same.

*Uranus* comes to opposition with the Sun on July 20th, and is therefore above the horizon most of the night during the two months. It is retrograding (moving westward) slowly along the border-line between *Sagittarius* and *Capricornus*, and, unfortunately, there is no good naked-eye star near it so as to afford a means of identification.

*Neptune* is in the evening sky until July 14th, but too close to the Sun for even telescopic observation. It then passes conjunction and becomes a morning star, rising by the end of August shortly before 2 A. M. It remains in the constellation *Gemini*.

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## PLANETARY PHENOMENA FOR SEPTEMBER AND OCTOBER, 1911.

By MALCOLM McNEILL.

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### PHASES OF THE MOON, PACIFIC TIME.

Full Moon ... Sept. 8, 7 <sup>h</sup> 57 <sup>m</sup> A.M.	Full Moon ... Oct. 7, 8 <sup>h</sup> 11 <sup>m</sup> P.M.
Last Quarter . " 15, 9 51 A.M.	Last Quarter .. " 14, 3 46 P.M.
New Moon ... " 22, 6 37 A.M.	New Moon ... " 21, 8 9 P.M.
First Quarter.. " 30, 3 8 A.M.	First Quarter .. " 29, 10 41 P.M.

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The second of the two eclipses of the year is an annular eclipse of the Sun on October 21st. No part of the eclipse will be visible from any part of the Western Hemisphere. The path of central eclipse runs from the Aral Sea southeast through Asia and ends in the Pacific Ocean northeast of Australia.

The Sun crosses the equator from north to south and autumn begins September 23d, 8 P. M., Pacific time.

At the beginning of September *Mercury* is an evening star, too near the Sun for naked-eye view. It passes inferior conjunction and becomes a morning star on the morning of September 9th. It then moves rapidly out toward greatest west elongation, 17° 52', which it reaches on the morning of September 25th. This is a small greatest elongation, as the planet passes perihelion less than twelve hours later, but it will then rise about an hour and one half before sunrise and can be seen

easily on a clear morning. By the end of the first week in October the interval will diminish to about an hour, and after that the planet will be too near the Sun to be seen. It passes superior conjunction with the Sun and becomes a morning star on October 23d.

*Venus* also is an evening star on September 1st, setting only fifteen minutes after sunset. It reaches inferior conjunction with the Sun on September 15th, but as it is then at approximately its minimum distance from the Earth and at the same time in the part of its orbit farthest below the plane of the Earth's orbit, it will pass about  $5^{\circ}$  south of the Sun. In consequence of this there will be several days when the planet will set before sunset and rise after sunrise. Its motion westward relative to the Sun is, however, very rapid; and in a few days after conjunction it can be seen in the eastern twilight as a morning star. On October 1st it rises an hour and three quarters before sunrise and on October 31st more than three and a half hours. It is in conjunction with *Mercury* on September 24th, but owing to its great southern declination the minimum distance of the two planets is  $9^{\circ} 26'$ . It again reaches its position of greatest brightness on October 22d, and is easily visible by daylight for a few weeks before and after that date.

*Mars* rises at about 10 P. M. on September 1st, shortly before 9 P. M. on October 1st, and at about 6:40 P. M. on October 31st. It is in the constellation *Taurus*, and up to October 17th moves eastward with diminishing rapidity, when it becomes stationary among the stars and then begins to move westward. The line of westward motion lies some degrees north of the line of eastward motion followed during August and September, and will continue until December 29th. By that date it will have moved about  $18^{\circ}$  westward, and it will then be about  $4^{\circ}$  north of the position it held on August 22d. On October 1st it passes about  $4^{\circ}$  north of the first magnitude red star *Aldebaran*,  $\alpha$  *Tauri*, and it will again be in conjunction with the same star on November 1st, but at the latter conjunction the minimum distance will be more than  $1^{\circ}$  greater. From September 1st to October 31st its distance from the Earth diminishes from 77,000,000 to 49,000,000 miles and its brightness increases from

a little less than one half of what it will be when nearest us in November, to within about 5 per cent of the maximum.

*Jupiter* sets at about 9 P. M. on September 1st and at about 5:40 P. M. on October 31st, only about forty minutes after sunset, so that toward the end of October it will not be an easy object for naked-eye observation. It moves about  $11^{\circ}$  eastward and  $4^{\circ}$  southward through *Libra* toward *Scorpio* during the two months.

*Saturn* is well on toward opposition with the Sun, rising shortly before 10 P. M. on September 1st and shortly before 6 P. M. on October 31st. It begins its retrograde motion on September 3d, and by the end of October it will move about  $3^{\circ}$  westward and  $1^{\circ}$  southward among the stars along the border line between *Aries* and *Taurus*. The ratio of minor to major axis of the rings as seen in the telescope diminishes very slightly, but remains about one third, and the minor axis is a little less than the diameter of the planet.

*Uranus* sets at about 2 A. M. on September 1st and at about 10 P. M. on October 31st. It is on the border-line between *Sagittarius* and *Capricornus*, and retrogrades, moves westward, until October 5th, and then moves eastward, but the whole motion is confined to a space about the size of the disc of the Moon. No bright stars are near it.

*Neptune* rises shortly before 2 A. M. on September 1st and shortly before 10 P. M. on October 31st. It remains in the constellation *Gemini* not far from *Castor* and *Pollux*.

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#### PRESENTATION OF THE DRAPER GOLD MEDAL TO PROFESSOR CHARLES G. ABBOT.<sup>1</sup>

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The president of the Academy, Dr. REMSEN, announced the award of the Henry Draper Gold Medal to Professor CHARLES G. ABBOT, director of the astrophysical observatory of the Smithsonian Institution. He described briefly the establishing of a fund in support of the medal by Mrs. DRAPER, and gave a list of the eight previous awards. He called upon Director

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<sup>1</sup> Following the National Academy Dinner at the Cosmos Club, Washington, D. C., on the evening of April 19, 1911.